README

Data have been stored by figure in \*.zip for clarity and space respectively.

**DATA\_FIGURE\_1.zip**

*This part gathers the data of optogenetic pairs recordings between neurochemical population of Golgi cells (GlyT2(-) or GlyT2(+)) and granule cells. IPSCs are evoked in granule cells by single optogenetic stimulation of Golgi cells soma. Data were acquired at 20 kHz.*

FIGURE\_1F\_Threshold\_stimulation\_power : a excel table with the optogenetic power (µW/mm²) apply on Golgi cells to evoke an efficient stimulation that correspond to >80% of action potential (AP) (see material and method of the main manuscript). Each raw of the table is one Golgi cell with the light power to evoke an efficient response at the axon, apical dendrites and soma. Some cells showed no efficient response to the optogenetic stimulation at the axon or dendrites and were marked “NaN”(Not A Number).

FIGURE\_1G\_AP\_success\_rate : Due to the non-specificity of the efficient optogenetic stimulation (see manuscript) we applied an around threshold stimulation that evoked success and failure of AP in a cell specific proportion. This file resumes the success rate of AP (%) evoked in this way in each Golgi cells of the study (n=64).

**DATA\_FIGURE\_2.zip**

*This part gathers the data of optogenetic pairs recordings between neurochemical population of Golgi cells (GlyT2(-) or GlyT2(+)) and granule cells. IPSCs are evoked in granule cells by single optogenetic stimulation of Golgi cells soma. Data were acquired at 20 kHz.*

In this folder, each connected Golgi cell – granule cell pair data are stored in a folder corresponding to the neurochemical type of the presynaptic Golgi cells : GlyT2(-) (purely GABAergic cells) or GlyT2(+) (GABAergic/glycinergic cells). In these populational folder, each pair is store in a specific sub-folder.

These sub-folder (i.e : GlyT2(-)/golgi1\_grain1\_tranche1\_010119) contain :

* I\_AP(+).npy : IPSC (inhibitory postsynaptic potential current) amplitude (pA) from the averaged recording of the granule cell when an optogenetic stimulation was apply to the Golgi cell soma and triggered an AP. The \*.npy is a type of file generated by the Numpy library on Python and can easily be open with the following command :
  + Import Python
  + Import numpy as np
  + Data = np.load(“the file path.npy”)
* Mean\_AP(-).txt : the averaged recording of the granule cell when the optogenetic stimulation failed to evoke an AP in the Golgi cell (pA). The \*.txt file can also be easily open with Numpy as follow :
  + Data = np.loadtxt(“the file path.txt”)
* Mean\_AP(+).txt : same as above when the optogenetic stimulation evoke an AP in the Golgi cell (pA).
* Mean\_AP(+)\_IPSC(-).txt : same as above when the Golgi cell AP fail to evoke an IPSC in the granule cell (pA).
* Mean\_AP(+)\_IPSC(+).txt : same as above when the Golgi cell AP evoke an IPSC in the granule cell (pA).
* P\_failure.npy : the IPSC failure probability (see the manuscript for details).
* Synaptic\_delay.npy : time between the peak of the AP and the peak of the IPSC (ms).

NB : some pair show no IPSCs failure in our dataset. Thus, some sub-folder in this section don’t have mean\_AP(+)\_IPSC(-) and the failure probability is 0 or very close to 0.

The DATA\_FIGURE\_2 also contain populational \*.txt of the following variables:

* I\_AP(+)\_GlyT2(+) : IPSC amplitude (pA) from the averaged recording of the granule cell when the optogenetic stimulation applied to GlyT2(+) Golgi cell soma triggered an AP.
* I\_AP(+)\_GlyT2(-) : IPSC amplitude (pA) from the averaged recording of the granule cell when the optogenetic stimulation applied to GlyT2(-) Golgi cell soma triggered an AP.
* I\_AP(+)\_IPSC(+)\_GlyT2(+) : IPSC amplitude (pA) from the averaged recording of the granule cell when the optogenetically triggered AP in GlyT2(+) Golgi cell evoked an IPSC.
* I\_AP(+)\_IPSC(+)\_GlyT2(-) : IPSC amplitude (pA) from the averaged recording of the granule cell when the optogenetically triggered AP in GlyT2(-) Golgi cell evoked an IPSC.
* p\_failure\_GlyT2(+) : failure probability of the IPSC in GlyT2(+) pairs.
* p\_failure\_GlyT2(-) : failure probability of the IPSC in GlyT2(-) pairs.
* synaptic\_delay\_GlyT2(+) : time between the peak of the AP and the peak of the IPSC in GlyT2(+) pairs (ms).
* synaptic\_delay\_GlyT2(-) : time between the peak of the AP and the peak of the IPSC in GlyT2(-) pairs (ms).

**DATA\_FIGURE\_3.zip**

*This part gathers the data of optogenetic pairs recordings between neurochemical population of Golgi cells (GlyT2(-) or GlyT2(+)) and granule cells. IPSCs are evoked in granule cells by single optogenetic stimulation of Golgi cells soma. Data were acquired at 20 kHz.*

In this folder, individual pair data are stored in the same way as described above. Each populational sub-folder (i.e : GlyT2(-)/golgi1\_grain2\_tranche1\_220620) contain :

* I\_phasic.npy : the amplitude of the averaged IPSCs classified as Phasic IPSC (pA) (see manuscript for details).
* Mean\_delayed.txt : Averaged IPSC classified as delayed IPSC (pA) (see manuscript for details).
* Mean\_phasic.txt : same as above for phasic IPSC (pA).
* Nb\_ipsc.npy : number of IPSC
* Nb\_phasic\_ipsc.npy : number of phasic IPSC. These two numbers of event are used to calculate the proportion of each type of IPSC.

NB : Phasic IPSCs are characterized by a fast-rising phase as classical IPSCs. A the contrary, delayed IPSCs exhibit a slow rising phase but a decay kinetic similar to the slow decay component of phasic IPSC. In our study, delayed IPSC are considered as slow synaptic current and not spillover event.

The DATA\_FIGURE\_3 folder also contains two excel table with the values describing the decay kinetic of the mean\_AP(+) traces recorded from each pair (FIT\_mean\_AP(+).csv) and the averaged phasic and delayed IPSCs traces (FIT\_mean\_Phasic\_and\_mean\_Delayed\_IPSC.csv).

FIT\_mean\_AP(+).csv : Analysis of the IPSC decay kinetic of averaged granule cell recording when the Golgi cell emit an AP. IPSCs decay were fitted in a 100 ms time window from the IPSC pic with a bi-exponential function. The table contains the value describing the two components of the fit as follow :

* + A1 : amplitude of the first component (pA)
  + TAU1 : time of the first component (ms)
  + A2 : amplitude of the second component (pA)
  + TAU2 : time of the second component (ms)

GlyT2 = 0 means GlyT2(-) and GlyT2 = 1 means GlyT2(+).

FIT\_mean\_Phasic\_and\_mean\_Delayed\_IPSC.csv : same as above for averaged phasic and delayed IPSCs. Phasic IPSC have been fitted with a bi-exponential function, but the delayed IPSC have been fitted with a mono-exponential function, both in the same 100 ms time window.

With the kinetic parameters of each time component of the IPSCs decay we calculated the corresponding charge for AP(+)\_IPSC, phasic and delayed IPSC in GlyT2(-) and GlyT2(+) population as follow :

* + Q2\_phasic : charge of the second decay component of phasic IPSC = A2\_phasic x TAU2\_phasic (pC).
  + QAP(+) : charge of the AP(+)\_IPSC decay = A1 x TAU1 + A2 x TAU2 (pC).
  + Qdelayed : charge of the delayed IPSC decay (pC) = A\_delayed x TAU\_delayed.

The DATA\_FIGURE\_3 folder also includes the amplitude of the phasic IPSC (I\_phasic\_GlyT2(-).txt and I\_phasic\_GlyT2(+).txt), the ratio between QAP(+) and IAP(+) and the ratio between Qdelayed and I\_phasic both for GlyT2(-) and GlyT2(+) population.

NB : some pairs could not be included in the decay kinetic analysis because of a too low signal-to-noise ratio or because they did not have enough occurrence of phasic or delayed IPSC to be properly fitted.

DATA\_FIGURE\_3 also contain a folder name “GoC-GrC individual\_traces”. This folder follows the same sub-folder organization in GlyT2(-) and GlyT2(+) population in which each optogenetic pair have a dedicated sub-folder containing :

* CDF.svg : the cumulative distribution of the charges (pC) measured in the granule cell before (grey curve) and after (blue curve) the Golgi cell AP (see manuscript for details). The red line represents the failure probability of IPSC mentioned above. In pairs with no failure the red line is at zero.
* Traces\_delayed.npy : all individuals traces (pA) of a granule cell that has been classified as delayed IPSC (see manuscript for details about the method).
* Traces\_IPSC(-).npy : all individuals traces (pA) of a granule cell that has been classified as IPSC failure (see manuscript for details about the method).

NB : pairs with no IPSC failure (red line at zero in CDF.svg) do not have that file.

* Traces\_phasic.npy : all individuals traces (pA) of a granule cell that has been classified as phasic IPSC (see manuscript for details about the method).

**DATA\_FIGURE\_4.zip**

*This part gathers the data of optogenetic pairs recordings between neurochemical population of Golgi cells (GlyT2(-) or GlyT2(+)) and granule cells. IPSCs are evoked in granule cells by single optogenetic stimulation of Golgi cells soma. Data were acquired at 20 kHz.*

Connected\_pairs\_Figure\_4A : this folder contains for each neurochemical population of presynaptic Golgi cells (GlyT2(-) or GlyT2(+)), a sub-folder for each connected pair with :

* Integral\_mean\_AP(+)\_connected.txt : cumulated sum (pC) of the averaged recording of the presynaptic granule cell when the optogenetic stimulation trigger an AP in the Golgi cell. This is the evolution of the charge over the time.
* Mean\_AP(+)\_connected.txt : the averaged trace used for the integral above (pA).

Connected\_pairs\_Figure\_4B : this folder contains for each neurochemical population of presynaptic Golgi cells (GlyT2(-) or GlyT2(+)), a sub-folder for each connected pair with :

* Integral\_mean\_AP(-).txt : as above when the optogenetic stimulation failed to evoke an AP in the Golgi cell (pC).
* Integral\_mean\_AP(+)\_IPSC(-).txt : as above when the optogenetic stimulation evoke an AP in the Golgi cell but there is no IPSC recorded in the postsynaptic granule cell (pC).
* Mean\_AP(-).txt : the averaged trace used for the corresponding integral (pA).
* Mean\_AP(+)\_IPSC(-).txt : the averaged trace used for the corresponding integral (pA).

Unconnected\_pairs\_Figure\_4B : this folder contains the same files as Connected\_pairs\_Figure\_4B but for unconnected pairs.

The DATA\_Figure\_3 folder also contains :

* I\_AP(+)\_GlyT2(+) : IPSC amplitude (pA) from the averaged recording of the granule cell when the optogenetic stimulation applied to GlyT2(+) Golgi cell soma triggered an AP.
* I\_AP(+)\_GlyT2(-) : IPSC amplitude (pA) from the averaged recording of the granule cell when the optogenetic stimulation applied to GlyT2(-) Golgi cell soma triggered an AP.
* Qslow\_AP(-)\_connected\_pairs.txt : charge of the averaged granule cell recording in absence of Golgi cell AP in connected pairs (pC). This charge is the last value of the corresponding integral.
* Qslow\_AP(-)\_unconnected\_pairs.txt : same as above for unconnected pairs (pC).
* Qslow\_AP(-)\_connected\_unconnected\_pairs.txt : pooled value of the two \*.txt files above.
* Qslow\_AP(+)\_GlyT2(-).txt : charge of the averaged granule cell recording when the presynaptic GlyT2(-) Golgi cell fired an AP upon the optogenetic stimulation (pC).
* Qslow\_AP(+)\_GlyT2(+).txt : same as above for GlyT2(+) pairs (pC).
* Qslow\_AP(+)\_IPSC(-)\_connected\_pairs.txt : charge of the averaged granule cell recording when the presynaptic Golgi cell fired an AP upon the optogenetic stimulation but didn’t evoke IPSCs (pC).
* Qslow\_AP(+)\_unconnected\_pairs.txt : charge of the averaged granule cell recording when the presynaptic Golgi cell fired an AP upon the optogenetic stimulation (pC).

**DATA\_FIGURE\_5.zip**

*This part gathers the data of our pharmacological experiment. IPSCs are evoked in granule cells by continuously stimulation electrically Golgi cells axons at 10 Hz, a frequency close to their regime of activity in vivo. Data were acquired at 20 kHz.*

ACSF : this folder contains two sub-folders for control experiment (CTRL) and experiment where glycine applications were performed (Glycine). Each sub-folder contain data from granule cells recorded in the corresponding pharmacological condition (i.e : ACSF/CTRL/cell1). The sub-folder of each cell contains the following :

* Normalized\_charge\_to\_peak\_ratio.npy : ratio between the charge (pC) and the peak amplitude (pA) of averaged consecutive 100 electrically evoked IPSC at 10 Hz, normalized by the mean ratio of the 3 first minutes of recording (baseline). Each point corresponds to 100 events at 10 Hz, so 10 sec.
* T1.txt : average trace of 1000 consecutive electrically evoked IPSC at 10 Hz (1.6 min in total) before the end of the baseline (pA).
* T2.txt : same as T1.txt but at the end of the glycine application time window (5 min post baseline) (pA).
* T3.txt : same as above at the end of the recording (15 min) (pA).
* Ratio\_T2\_T1.npy : charge (pC) to peak amplitude (pA) ratio between T2 and T1. This is a metric of the evolution of the inhibitory strength between the baseline (T1) and the application of glycine (T2) (when it occurs -> sub-folder “Glycine”). In the CTRL sub-folder, this ratio evaluates purely the decrease of the transmission strength over time.
* Ratio\_T3\_T1.npy : charge (pC) to peak amplitude (pA) ratio between T3 and T1.
* Raw\_trace.txt : raw recording of the granule cell during the continuous electrical stimulation of the nearby Golgi cells axons (pA) (GlyT2(-) and GlyT2(+) alike).

ACSF\_Glutamine : same as ACSF but in a different pharmacological condition. The glutamine was constitutively added to the ACSF during the recovery of the brain slices and the recordings. Glutamine is a precursor to the GABA synthesis (see the manuscript for more information).

ACSF\_ORG25543 : same as ACSF but in a different pharmacological condition. ORG25543 was constitutively added to the ACSF during the recovery of the brain slices and the recordings. ORG25543 is a specific blocker of the neuronal transporter of glycine, GlyT2 (see the manuscript for more information).